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10/564,956	12/05/2007	Takashi Namari	053547	5396

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EXAMINER	
HAMAOUI, DAVID E	

ART UNIT	PAPER NUMBER
3747	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/564,956	NAMARI ET AL.	
	Examiner	Art Unit	
	DAVID HAMAOUI	3747	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 December 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 12/31/2008 have been fully considered but they are not persuasive.

2. In response to Applicant's argument of:

3. Ohira [0007] refers to a prior art device, not the device of Ohira.

Examiner acknowledges that this paragraph is referring to a prior art device, but submits that Applicant has misunderstood what Examiner intended to be extracted from this citation. Ohira describes a problem of a prior art reference that Ohira will attempt to solve. This problem is similar to the problem Applicant describes and Ohira's solution results in the problem being solved in a similar way to Applicant's solution.

4. Ohira [0007] does not refer to the start up period of an engine.

As explained above, the purpose of this citation was not to directly cite the disclosure of a limitation. The solution Ohira proposes (tooth structure) is effective at all times the crankshaft is rotating. This includes start-up.

5. Art clearly disclosing crank angle sensors which are more "full" of teeth should be cited and applied.

The art **has** been applied in the form of a well known feature. As for citation, the following is a list of prior art references (all US patents) of crank angle sensors that disclose many different numbers of teeth. It should be noted that this listing is merely a sample:

4413508	5979413	6404188	6968269
6496750	6032649	6827063	
5823166	6208131	6836219	

6. The distance between rear end portions of teeth is not a known results yielding variable.

The very fact that there are so many crank angle sensors with different distances between rear end portions of the teeth adequately discloses that this is a known results yielding variable considered in design and therefore in optimization. Some of the above mentioned references discuss why a particular number of teeth or spacing was chosen as well. Furthermore, Applicant suggests that Ohira teaches

away from the modification of adding more teeth as it would increase costs. Examiner does not concede to this assessment of Ohira, but accepts the notion that it is known that a sensor having more teeth may require higher costs. This alone is a known reason to optimize the number/spacing of teeth.

7. Ohira teaches away from the proposed modification.

8. Examiner acknowledges that Ohira does indeed teach that in its preferred embodiment, there are a minimal number of teeth. However, this is not a correct application of the notion of 'teaching away'. One skilled in the art can be reasonably expected to take particular desirable features from a disclosure and apply them elsewhere without being forced to take all of the teachings from that disclosure. If, for whatever reason, an engineer desired to use a crank angle sensor having many evenly distributed teeth (as is well known), they can still apply the teachings of Ohira without any problem. Perhaps they would be sacrificing the proposed benefits of having only a few teeth, but that does not preclude them from applying these teachings elsewhere. It is simply a design consideration.

9. **Regarding Applicants arguments concerning claim 11:**

10. Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 6, 7, and 9-6, 10-6, and 11-6 are rejected under 35 U.S.C. 102(b) as being unpatentable over Ohira (US 2002/0112711 A1).

13. **In re claim 6**, Ohira ('711) discloses ([0033] – [0035] and figure 1) an ignition timing controller comprising:

- a crank angle detecting means (10) rotated in association with a crank shaft of an internal combustion engine, for generating a crank angle pulse signal for each rotation of a predetermined

angle, and for generating the pulse signal immediately before the crank angle corresponding to the top dead center of a piston of said internal combustion engine as a reference pulse signal having an aspect different than an aspect of non-reference crank angle pulse signals, said crank angle detecting means being rotated in association with a crank shaft of an internal combustion engine; and

- an ignition control means (31) for controlling ignition timing of said internal combustion engine in accordance with said crank angle pulse signal.

Regarding the limitation:

"wherein in a period from when cranking of said internal combustion engine is started to when said crank shaft has completed one rotation, said ignition control means instructs spark discharge of an ignition plug of said internal combustion engine for the ignition timing in accordance with a reference crank angle pulse signal generated immediately after said reference pulse signal."

This limitation is functional language, and as such, it is not given patentable weight in an apparatus claim [MPEP 2144]. A prior art reference need only **be able** to perform the claimed functionality in order to anticipate the claimed invention. Not only is the system of Ohira able to perform as such, it will necessarily perform this functionality in its normal operation.

14. **In re claim 7**, Ohira has been discussed and further discloses [0009] wherein the ignition control means controls electric supply timing to an ignition coil in accordance with said reference pulse signal before (inherent) the instruction of the spark discharge of said ignition plug in the period until said crank shaft is rotated once after the cranking of said internal combustion engine is started.

15. **In re claims 9-6, 10-6, and 11-6**: The subject matter of these claims is substantially functional language. They do not seem to add any structure to the claimed invention. (See above, In re claim 6). The prior art is **able** to perform these functions.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

18. Claims 1 – 5, 8, 9-8, 10-8, and 11-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ono (US 6,032,649) in view of Ohira (US 2002/0112711 A1).

19. **In re claim 1**, Ono discloses a crank angle detector comprising:

- a rotor (1) rotated in association with a crank shaft of an internal combustion engine and including projections, every projection on said rotor being one of a plurality of detection portions (2) to be detected at equivalent angle intervals on the outer circumference, with the exception of the teeth missing as a reference area;
- a pickup (3) arranged at the vicinity of the outer circumference of said rotor, said rotor generating a pulse signal when said plurality of detection portions each pass there through
- wherein a selected detection portion (area of phantom detection portions A) among said plurality of detection portions is set to detect a reference angle of the crank angle.

Ono lacks wherein the selected reference detection portion is located immediately before a crank angle corresponding to the top dead center of a piston [0033] of said internal combustion engine.

Ohira discloses (fig 1) a crank angle sensor wherein a reference detection portion (20) among a plurality of detection portions is located immediately before a crank angle corresponding to the top dead center of a piston [0033] of an internal combustion engine, the selected detection portion being set to detect a reference angle of the crank angle.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Ono by providing wherein the reference indicator is a tooth, as taught by Ohira, instead of a missing tooth portion. [This modification would result in a sensor wherein every projection on the rotor is one of a plurality of detection portions to be detected at equivalent angle intervals on the outer circumference.] It would have been further obvious to place this reference tooth at a point located immediately before a crank angle corresponding to the top dead center of a piston [0033] of the internal combustion engine as taught by Ohira, as this is a known technique and thus within the capability of one having ordinary skill.

20. **In re claims 2, 3, and 4**, Ohira ('711) further discloses (figure 1) wherein a plurality of detection portions are constructed by projections, respectively, and the one detection portion for detecting the reference angle is set to a length different from the lengths of the other detection portions in the outer circumferential direction of said rotor.

21. **In re claim 5**, the modification discussed above (In re claim 1) would result in a sensor wherein the respective rear end positions of the plurality of detection portions are located at equivalent angle intervals in the rotating direction of said rotor, wherein a rear end of a detection portion passing through the vicinity of said pickup after the selected detection portion is located within a range of zero to ten degrees (Ohira [0033]) from the crank angle corresponding to the top dead center.

Ono/Ohira lacks wherein the respective rear end positions of the plurality of detection portions are located at equivalent angle intervals **of 15 degrees** in the rotating direction of said rotor.

However, a crank angle sensor that is more "full" of detection portions, lacking only one or two detection portions to provide for a reference area, is well known in the art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the number of detection portions such that their equivalent displacement around the rotor's circumference was 15 degrees in order to provide for a more thorough knowledge of the angular position of the crankshaft, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Please note that in the instant application, page 5, line 13, applicant has not disclosed any criticality for the claimed limitations.

22. In re claim 8, see above (In re claims 1 – 4).

23. **In re claim 9-8**, Ohira ('711) further discloses [0037] wherein said crank angle pulse signal including said reference pulse signal is constructed by a negative pulse and a positive pulse constituting a pair, but lacks, wherein said negative pulse is generated correspondingly to the front end of each of said detection portions, and said positive pulse is generated correspondingly to the rear end of each of said detection portions.

Rather, Ohira ('711) discloses wherein the positive pulse corresponds to the front end of each detection portion and the negative pulse corresponds to the rear end. It would have been obvious to one having ordinary skill in the art to have set the pulses in the claimed manner as examiner takes official notice as to the equivalence of these techniques for their use in the art and the selection of any of these known equivalents would be within the level of ordinary skill in the art.

24. **In re claim 10-8**, Ohira ('711) further discloses [0051] wherein said ignition control means discriminates said reference pulse signal in accordance with the magnitude of a ratio of the generating interval of said negative pulse and the generating interval of said positive pulse.

*25. **In re claim 11-8**, see above, (In re claim 11-6).*

Double Patenting

26. The rejection on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 - 16 of U.S. Patent No. 7360407 is hereby withdrawn.

Conclusion

27. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action

is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

28. See PTO-892: Notice of References Cited.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID HAMAOUI whose telephone number is 571-270-5625. The examiner can normally be reached on Monday - Friday, 7:30am - 5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Cronin can be reached on 571-272-4536. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/DAVID HAMAOUI/
Examiner, Art Unit 3747

/Stephen K. Cronin/
Supervisory Patent Examiner, Art Unit 3747